

**LESSON**
8.5**Practice C**

For use with pages 582–588

Find the least common denominator.

1. $\frac{x}{x-3}, \frac{3}{x^2-9}, \frac{x+1}{2x}$

2. $\frac{1}{x+4}, \frac{3x}{2(x-3)}, \frac{2x-5}{x^2+x-12}$

3. $\frac{1}{3x-3}, \frac{2}{x^2+x-6}, \frac{3}{x^2-3x+2}$

4. $\frac{x-3}{x^2-2x-3}, \frac{x+1}{x^2+6x+5}, \frac{x+5}{x^2+7x+6}$

Perform the indicated operation and simplify.

5. $\frac{3x}{x^2+3x-10} - \frac{2}{x+5}$

6. $\frac{x+1}{3x-9} + \frac{5}{x^2-5x+6}$

7. $\frac{3}{x} + \frac{x+2}{x^2} - \frac{x^2+3}{x^3}$

8. $\frac{2x}{x+1} - \frac{3x}{x-1} + \frac{6}{x^2-1}$

9. $\frac{4}{x} + \frac{x-1}{3x+6} + \frac{3}{x^2+2x}$

10. $\frac{x+4}{x^2+2x+1} + \frac{x}{x^2-1} - \frac{2}{x-1}$

11. $\frac{2}{3} + \frac{x}{2x+1} - \frac{x+1}{2x^2-5x-3}$

12. $\frac{4x-1}{x^2+x+1} - \frac{1}{2x-2} - \frac{x}{x^3-1}$

Simplify the complex fraction.

13.
$$\frac{\frac{1}{2} + \frac{2}{x-6}}{\frac{3x-6}{x^2-12x+36}}$$

14.
$$\frac{\frac{2}{x+1} + \frac{3}{x-2}}{\frac{x}{x+1} + \frac{1}{x^2-x-2}}$$

15.
$$\frac{\frac{x-3}{x^2+2x-8}}{\frac{2x+3}{x^2+9x+20} - \frac{1}{x-2}}$$

16.
$$\frac{\frac{x-3}{x^3} - \frac{2}{x^3+x^2}}{\frac{1}{2} - \frac{1}{x^2}}$$

In Exercises 17–19, use the following information.

Electrical Resistors The total resistance R (in ohms) of three resistors in a parallel circuit is given by the formula $R = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$ which can be simplified

$$\text{to } R = \frac{R_1 R_2 R_3}{R_1 R_2 + R_1 R_3 + R_2 R_3}.$$

17. Simplify the similar formula for four resistors in a parallel circuit given by the formula $R = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}}$.

18. If you have four resistors in a parallel circuit with resistances of 6 ohms, 12 ohms, 18 ohms, and 24 ohms, what is the total resistance?

19. Following the pattern, write the simplified formula for the total resistance R (in ohms) of five resistors in a parallel circuit.



Lesson 8.5, continued

7. $(x-1)(x+3)$ 8. $6x(x+3)$

9. $4x(x-1)(x+1)$ 10. $\frac{4x+9}{6x^2}$ 11. $\frac{5x^2-2x+4}{2x^2}$

12. $\frac{5x-7}{(x+1)(x-3)}$ 13. $\frac{-3(x+2)}{x+4}$

14. $\frac{x^2-x+12}{(x-4)(x+2)}$ 15. $\frac{2x^2-4x+7}{(x-2)(x+2)}$ 16. $\frac{4x}{2x+1}$

17. $\frac{2(6-x)}{3(x+2)}$ 18. $\frac{2(3x+2)}{-(x-2)(x+1)}$

19. $z = \frac{3xy}{y+2x}$ 20. 5 mL

Practice Level B

1. $(x-3)(2x+3)$ 2. $(x+2)(x-1)$

3. $(x-2)(x+2)$ 4. $3x(x-3)(x+3)$

5. $\frac{x+2}{3x+1}$ 6. $\frac{6x-5}{(x-3)(x-1)}$ 7. $\frac{3x^2+15x-2}{(x-5)(x+5)}$

8. $\frac{5x^2-8x+4}{x^2(x-2)}$ 9. $\frac{x^2-x-10}{(x+3)(x+2)}$

10. $\frac{(3x-2)(x+1)}{x(x+2)^2}$ 11. $\frac{2x^2+x-4}{x^2-2}$

12. $\frac{(2x-1)(x+2)}{(x+4)(x-3)(x+1)}$ 13. $\frac{2(5x-2)}{x}$

14. $\frac{x(2x+13)}{3(2x^2-x-2)}$ 15. $\frac{4x(x-2)}{4x^2-10x+5}$

16. $T = \frac{-1374t^2 - 20,461t + 1,627,410}{(85-t)(55-2t)}$

17. about 470,933 MDs; about 18,743 DOs

Practice Level C

1. $2x(x+3)(x-3)$ 2. $2(x-3)(x+4)$

3. $3(x-1)(x-2)(x+3)$

4. $(x+1)(x-3)(x+5)(x+6)$

5. $\frac{x+4}{(x+5)(x-2)}$ 6. $\frac{x^2-x+13}{3(x-3)(x-2)}$

7. $\frac{3x^2+2x-3}{x^3}$ 8. $\frac{6-x}{x+1}$ 9. $\frac{x^2+11x+33}{3x(x+2)}$

10. $\frac{-6}{(x-1)(x+1)^2}$ 11. $\frac{7x^2-22x-9}{3(2x+1)(x-3)}$

12. $\frac{7x^2-13x+1}{2(x-1)(x^2+x+1)}$ 13. $\frac{x-6}{6}$ 14. $\frac{5x-1}{(x-1)^2}$

15. $\frac{(x-3)(x+5)}{x^2-10x-26}$ 16. $\frac{2(x^2-4x-3)}{x(x^3+x^2-2x-2)}$

17. $R = \frac{R_1 R_2 R_3 R_4}{R_1 R_2 R_3 + R_1 R_2 R_4 + R_1 R_3 R_4 + R_2 R_3 R_4}$

18. $\frac{72}{25}$ ohms

19. $R =$

$$\frac{R_1 R_2 R_3 R_4 R_5}{R_1 R_2 R_3 R_4 + R_1 R_2 R_3 R_5 + R_1 R_2 R_4 R_5 + R_1 R_3 R_4 R_5 + R_2 R_3 R_4 R_5}$$

Study Guide

1. $8(x-3)(x+3)^2$ 2. $5(x-3)(x-1)^2(x+1)$

3. $\frac{x^2+12x-12}{4x^2(x-1)}$ 4. $\frac{x^2-3x-12}{(x-3)(x+3)^2}$

5. $\frac{ab}{b-a}$ 6. $\frac{3x}{3x+2}$ 7. $\frac{3-2y}{3+4y}$

Problem Solving Workshop:

Worked Out Example

1. $t = \frac{234s - 1755}{s(s-15)}$, 6.5 h 2. 2.25 h

Challenge Practice

1. $\frac{2x-1}{2x}$ 2. $-\frac{1}{t^2 \sqrt{t^2+1}}$ 3. $\frac{3+\sqrt{x}}{6\sqrt{x}}$

4. $\frac{2(x+2)(x+4)}{3}$

5. $A = -4, B = 2, C = 2$

$$\begin{aligned} & \frac{-4}{x} + \frac{2}{x+1} + \frac{2}{x-1} \\ &= \frac{-4(x+1)(x-1) + 2x(x-1) + 2x(x+1)}{x(x+1)(x-1)} \\ &= \frac{-4(x^2-1) + 2x^2-2x + 2x^2+2x}{x(x^2-1)} \\ &= \frac{-4x^2+4+4x^2}{x^3-x} = \frac{4}{x^3-x} \end{aligned}$$

6. a. domain: all real numbers except $x = 1$,

range: all real numbers b. $f(f(x)) = \frac{x-1}{x}$;

domain: all real numbers except $x = 0$ and $x = 1$

c. $f(f(f(x))) = x$; the graph is not a line because the graph has holes at $x = 0$ and $x = 1$.

7. $\frac{x+5}{4(2x+3)}, \frac{7(x+1)}{4(2x+3)}, \frac{8(x+2)}{(x+4)^2}, \frac{x^2}{(x+4)^2}$

Lesson 8.6

Teaching Guide

1. *Sample answer:* To find a solution to an equation that when substituted back into the original equation results in a true statement; two equations with the same solution set; cross multiply or multiply both sides by the LCD; cross multiplying eliminates the need to find a LCD, but multiplying by the LCD results in a simpler equation

Practice Worksheet**Adding and Subtracting Rational Expressions***Simplify each expression.*

1. $\frac{5}{6ab} - \frac{7}{8a}$

2. $2x - 5 - \frac{x-8}{x+4}$

3. $\frac{4}{a-3} + \frac{9}{a-5}$

4. $\frac{16}{x^2-16} + \frac{2}{x+4}$

5. $\frac{5}{2x-12} - \frac{20}{x^2-4x-12}$

6. $\frac{2-5m}{m-9} + \frac{4m-5}{9-m}$

7. $\frac{2p-3}{p^2-5p+6} - \frac{5}{p^2-9}$

8. $\frac{1}{5n} - \frac{3}{4} + \frac{7}{10n}$

9. $\frac{\frac{r+6}{r} - \frac{1}{r+2}}{\frac{r^2+4r+3}{r^2+r}}$

10. $\frac{n+5 - \frac{12}{n+1}}{\frac{n+9}{n+1} - \frac{5}{n}}$

11. $\frac{\frac{2}{x-y} + \frac{1}{x+y}}{\frac{1}{x-y}}$

12. $\frac{x - \frac{5x}{x+2}}{\frac{x-3}{x}}$

Adding and Subtracting Rational Expressions

Simplify each expression.

1. $\frac{5}{6ab} - \frac{7}{8a}$

$$\frac{20 - 21b}{24ab}$$

2. $2x - 5 - \frac{x-8}{x+4}$

$$\frac{2(x+3)(x-2)}{x+4}$$

3. $\frac{4}{a-3} + \frac{9}{a-5}$

$$\frac{13a - 47}{(a-3)(a-5)}$$

4. $\frac{16}{x^2-16} + \frac{2}{x+4}$

$$\frac{2}{x-4}$$

5. $\frac{5}{2x-12} - \frac{20}{x^2-4x-12}$

$$\frac{5}{2(x+2)}$$

6. $\frac{2-5m}{m-9} + \frac{4m-5}{9-m}$

$$\frac{7-9m}{m-9}$$

7. $\frac{2p-3}{p^2-5p+6} - \frac{5}{p^2-9}$

$$\frac{2p^2 - 2p + 1}{(p-2)(p+3)(p-3)}$$

8. $\frac{1}{5n} - \frac{3}{4} + \frac{7}{10n}$

$$\frac{3(6-5n)}{20n}$$

9. $\frac{\frac{r+6}{r} - \frac{1}{r+2}}{\frac{r^2+4r+3}{r^2+r}}$

$$\frac{r+4}{r+2}$$

10. $\frac{n+5 - \frac{12}{n+1}}{\frac{n+9}{n+1} - \frac{5}{n}}$

$$\frac{n(n+7)}{n+5}$$

11. $\frac{\frac{2}{x-y} + \frac{1}{x+y}}{\frac{1}{x-y}}$

$$\frac{3x+y}{x+y}$$

12. $\frac{x - \frac{5x}{x+2}}{\frac{x-3}{x}}$

$$\frac{x^2}{x+2}$$